Since the writing of this article two new cases have been admitted to the ward and treated successfully with the serum. Last year a case was treated by Dr. Cushing which recovered and is described in Dr. Flexner's article in the *Journal of Experimental Medicine* for January, 1908. Another case was admitted and, although treated, died very soon after admission, so that the record here at the Johns Hopkins Hospital is of five recoveries out of six cases treated.

There have been too few cases reported to admit of the drawing of any conclusions, but the reports so far are encouraging and the results would seem to justify the further use of the serum until the efficiency of it as a cure for meningitis is established.

LESSONS IN DIETETICS *

By MARY C. WHEELER

Graduate of the Illinois Training School for Nurses and of the Hospital Economics Course

THE kitchen is a cooking laboratory and the same exactness, accuracy, and precision are necessary for success as in all experiments in the chemical laboratory. Air and food are the two most important factors in sustaining life and providing the necessary heat and energy. All foods should be clean, properly preserved, and so cooked that they are in a fit condition to become assimilated by the stomach and intestines and to preserve their natural flavor.

FUELS

Any combustible matter which feeds flame is a fuel. Kinds of such matter are classed as follows:

1. Fluids.
   - *a.* Gases. (Illuminating gas.)
   - *b.* Liquid. (Alcohol, gasoline, kerosene.)
2. Solids.
   - *a.* Wood.
   - *b.* Charcoal.
   - *c.* Peat.
   - *d.* Coal.
     1. Bituminous.
     2. Anthracite.

---

* As prepared for the pupils of the Blessing Hospital, Quincy, Illinois, from various sources, including Hutchinson's Food and Dietetics and the Lectures of Drs. Vulte and Bigelow.

Comparative advantages of different fuels.

1. Economy of heat.
2. Economy of money.
3. Economy of labor for the consumer.

Cooking Processes.

1. By conducted heat with
   - *a.* Water as the medium.
     - Boiling.
     - Steaming.
     - Stewing.
   - *b.* Fat as the medium.
     - Griddle cooking.
     - Pan broiling.
     - Sauté.
2. By radiant heat.
   - Toasting.
   - Broiling.
   - Roasting.
   - Oven cooking.
     - *a.* Baking.
     - *b.* Braising.

FOOD AND FOOD STUFFS

A food may be defined as anything, which, when taken into the body, is capable either of repairing its waste or of furnishing it with material from which to produce heat or nervous and muscular work. Substances which are unable to help in either of these directions may have a useful place in the dietary, but they cannot be truly regarded as foods. Example of such substances are to be found in tea, coffee and the extractives of meat.

Most ordinary articles of diet are not simple bodies, they are made up of mixtures of various chemical substances, some of which are of nutritive value, others not. The former may be spoken of as the *nutritive constituents* or "nutrients" and may be classified as follows:

Organic.

1. Nitrogenous.
   - Proteids, *e.g.,* casein, myosin, gluten.
   - Albumenoids, *e.g.,* gelatin.

2. Non-nitrogenous.
   Carbohydrates, *e.g.*, starch, sugar.
   Fats, *e.g.*, olive oil, butter.

Inorganic.
   Mineral matters, *e.g.*, sodium, potassium, lime.
   Water.

Any article of diet, no matter how it is cooked, can be shown, by chemical analysis, to contain one or more of the members of these groups; otherwise it is not a "food" at all. The functions of food are fulfilled by the different groups in different measure. The first function, that of building up and repairing the tissues, can only be fulfilled by the proteids and inorganic constituents. The second function, that of serving as a source of potential energy, is the property of all the organic constituents, although there is a limited sense in which water, and even, perhaps, the mineral constituents, may be regarded as sources of energy.

One may, therefore, classify the nutritive constituents of food, in accordance with their functions in the body as follows:

Tissue formers.
   Proteids.
   Mineral matters.
   Water.

Work and Heat Producers.
   Proteids.
   Albumenoids.
   Carbohydrates.
   Mineral matters?
   Water?

It will be observed that proteids alone are able to fulfil both of the functions of a food. Without proteid, life is impossible, for the daily wear and tear of tissue must somehow be made good. With proteid, plus water and some mineral salts, life can be healthily maintained for a practically indefinite time, as is proved by the experience of tribes such as the Indians of the Pampas, who live year in and year out on nothing but lean beef and water. The most common classification of food stuffs is that of water, salts, proteids, carbohydrates and fat.

WATER is a chemical compound of the two gases, hydrogen and oxygen, in the proportion of 2 : 1. Water enters into the composition of every tissue in the body and forms over 60 per cent. of the entire body

weight. It is not burnt up and so does not supply energy to any great extent.

SALTS.—These form about 6 per cent. of the weight of the adult man. They are present in the bones, teeth, and other tissues. The principal salts of the body are, calcium phosphate and the various compounds of potassium, magnesium, sodium, iron. The mineral salts are very necessary to life and health.

PROTEIN.—Under this heading are included most of the food stuffs containing the element nitrogen. Protein is found in both animal and vegetable food, familiar examples of it being the lean and gristle of meat, the white of egg, the gluten of wheat and the curd of milk. The word "proteid" is used by some writers to describe these.

CARBOHYDRATES contain no nitrogen. They are composed of carbon, hydrogen, oxygen, and the last two elements always in the proportion to form water and the carbon either 6 or a multiple of 6. Carbohydrates are burnt up in the body and are the most important source of heat and energy. Excesses taken are converted into fat and stored up in the body. The superficial fat of the body protects it from cold and acts as a storehouse for the fat, which can be converted into heat and energy.

FAT, or hydrocarbon, is an important element of food, serving the same purpose as the carbohydrates. Fat supplies more heat and energy, weight for weight, than carbohydrates, but is neither so easily digested nor so available.

The changes which take place in the body in "burning up" the food material are designated by the name metabolism.

Such being the uses of foods in the body the question arises: How is one to judge of their relative value? By what criteria is one to decide whether any particular article of diet is a good food or not? The reply is that such a question can only be decided by submitting the food under consideration to these four tests:

1. CHEMICAL TEST.—Chemical analysis can tell us how much of each nutritive constituent (proteid, carbohydrate, etc.) one hundred parts of the food contain. With this information, one can arrive at an idea of the value of the food as a source of building material or energy.

2. THE PHYSICAL TEST.—This test must answer the question, how much potential energy is that particular food capable of yielding. The amount of heat which a food is capable of yielding on complete combustion may be taken as a measure of its value as a source of energy, for heat and work are convertible terms. The standard of heat production is the calorie, which means the amount of heat required to raise the temperature of 1 gm. of water 1 degree C. This is the small calorie.

For measuring the heat value of foods, one employs, for convenience, the large or Kilo-calorie, *i.e.*, the amount of heat required to raise the temperature of 1 litre of water 1 degree C. or 1 pound of water to 4 degrees F. This should be written with a large C. or capital letter—Calorie.

It has been determined that bacon yields the largest number of Calories, closely followed by butter, fat goose, fat pork, fat mutton, and going down the scale to lettuce which yields the least number of Calories.

Proteids yield 4.1 Calories.

Carbohydrates yield 4.1 Calories.

Fat yields 9.3. Calories.

Different food stuffs have different Caloric value, because the percentages of the food stuffs differ. Three thousand C.'s are needed for each individual in twenty-four hours, therefore the average individual must have 125 gm. proteid, 500 gm. carbohydrate, and 50 gm. of fat.

To apply this caloric standard to a food, multiply the percentage of proteid or carbohydrate which it contains by 4.1 and the percentage of fat by 9.3, to get the total Calories yielded by one hundred parts of the food in question.

3. The Physiological Test.—It is not enough that a food should contain a considerable proportion of proteid, carbohydrate and fat, and should be capable of yielding energy on oxidation. It must also be of such a nature that it can be easily digested in the stomach, and more or less completely absorbed into the blood. Such substances as sawdust, petroleum, etc., might pass the chemical and physical tests easily enough, but they are of no use in the body, for they cannot be digested and absorbed.

By a digestible food is meant one which is disposed of by the stomach with little trouble or without producing any feelings of discomfort, pain or uneasiness. The only absolute criterion of the digestibility of a food is the length of time it has to remain in the stomach before it is fit to be passed on into the intestine. The shorter time a food requires to stay in the stomach, the greater is its digestibility; and the longer the period which must elapse before it can pass on into the intestine the more indigestible the food is.

4. The Economic Test.—Having ascertained the richness of a food in nutritive constituents, the amount of energy which it is capable of yielding and the readiness with which it can be digested and absorbed, we have still to inquire whether the nutriment which it yields is obtained at a reasonable cost. The simplest way of applying such a test is to find out how much energy (in Calories) and how much building material

(in proteid) one can get for a particular sum when invested in the food under consideration.

Taking results as a whole, it will be observed that the vegetable foods are far cheaper than the animal foods, whether one uses them as sources of energy or of building material. Carbohydrate is by far the cheapest.

(*To be continued.*)

NURSING IN FINLAND *

By BARONESS MANNERHEIM

Directress of the Surgical Hospital, Helsingfors, and President of the Finnish Nurses Association

I HAVE been asked to say a few words about our Nurses' Association in Finland. It is not very old, not more than ten years, but already it has done a good deal to improve the standard of nursing in my country.

As late as in the seventies and early eighties the words nurses and servants were still almost synonymous. It was not until 1886 when the new surgical hospital of the University of Helsingfors was opened, that a somewhat regular training of nurses was organized, and that a one year course was decided upon. Until then half a year had been thought sufficient.

The probationers, however, then had no home. They had to live in the town and this was of course a great inconvenience. It was then that the Nurses' Association was founded, and the nurses decided to take the matter in their own hands by opening a Home for probationers, for which the necessary funds were secured, partly from private friends and partly from the Red Cross Society.

However, the Association could not compel the probationers to live in the Home, and the hospital directors thought it an interference with personal liberty to require it, so the Home became a sort of hotel where the nurses could stay if they liked and as long as they wished. The results of this system were, obviously, a lack of discipline, and advantage taken of the freedom accorded. The pupils who went to theatres or balls in the evening were not fit for their morning's work, and the others had to do double work. Then, as it was impossible to control the places where the nurses lived, cases of contagious disease not infrequently broke out in the hospital, from infection brought by careless pupils.

---

* Read at the Paris Conference, June, 1907.